

Please amend the claims as follows. This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A method for fabricating a spacer of a gate structure, the method comprising:

performing a first etch process implementing a first etchant gas, the first etch process configured to implement an interferometry endpoint (IEP) detection method to detect a removal of a portion of a spacer layer having a specific thickness;

discontinuing the first etch process upon removing the portion of the spacer layer, leaving a thin spacer layer;

performing a second etch process implementing a second etchant gas, the second etch having a high selectivity toward a material of the spacer layer, the second etch process configured to remove the thin spacer layer, the second etch process including monitoring by a non-IEP etch endpoint process; and

discontinuing the second etch process in response to the monitoring and when the second etch process has continued for a predetermined period of time,

wherein the second etch process is configured to remove the thin spacer layer, leaving the spacer for the gate structure.

Claim 2 (cancelled):

Claim 3 (original): The method of claim 1, wherein the IEP etch endpoint monitoring method is configured to monitor a photon beam reflected by the spacer layer so as

to determine the thickness of an etch depth during the first etch operation implementing the distance between consecutive maximum intensities.

Claim 4 (original): The method of claim 2, wherein the non-IEP etch endpoint monitoring method is optical emission spectroscopy (OES).

Claim 5 (original): The method of claim 1, wherein the spacer layer is a nitride layer.

Claim 6 (currently amended): A method for fabricating a spacer of a gate structure, the method comprising:

performing a first etch process implementing a first etchant gas, the first etch process configured to implement an interferometry endpoint (IEP) detection method to detect a removal of a portion of a spacer layer having a specific thickness from over the surface of the substrate, leaving a thin spacer layer; and

performing a second etch process for a predetermined period of time implementing a second etchant gas, the second etchant gas having a high selectivity toward a material of the spacer layer;

wherein the first etch process controls the removal of the portion of the spacer layer so as to maintain a thickness of the thin spacer layer substantially uniform throughout a surface of a substrate and the gate structure formed thereon, and the second etch process is configured to remove the thin spacer layer, leaving the spacer for the gate structure.

Claim 7 (currently amended): A method for forming a silicon nitride spacer,
the method comprising:

depositing a silicon nitride spacer layer over a substrate having a gate structure formed
thereon;

performing a first etch operation on the silicon nitride spacer layer in a plasma
chamber using a first etchant gas;

monitoring a light reflected by the silicon nitride spacer layer, the monitoring
configured to control a removal of a portion of the silicon nitride spacer layer;

stopping the first etch operation so as to leave a thin spacer layer over the surface of
the substrate and the gate structure formed thereon, the thin spacer layer configured to have a
substantially uniform thickness through out the surface of the substrate and the gate structure
formed thereon;

purging a first plasma content defined within the plasma chamber;

performing a second etch operation in the plasma chamber using a second etchant gas
having a high selectivity toward silicon nitride, the second etch operation configured to
remove the thin spacer layer;

monitoring an optical signal produced by a second plasma during the second etch
operation; and

discontinuing the second etch operation once the second etch operation has continued
for a predetermined period of time,

wherein performing the first etch operation and the second etch operation are
performed *in situ* so as to control a shape of nitride spacers and a removal of the spacer layer .

Claim 8 (original): The method of claim 7, wherein monitoring the light reflected from the surface of the substrate includes,

directing a photon beam onto the nitride spacer layer;
observing a photon beam reflected by the nitride spacer layer; and
determining an etch depth as the first etch operation proceeds.

Claim 9 (original): The method of claim 8, wherein determining the etch depth includes:

monitoring an intensity of the reflected light;
determining a distance between a pair of consecutive maximum intensities; and
determining the thickness of the etch depth implementing the distance between consecutive maximum intensities.

Claim 10 (original): The method of claim 7, wherein performing the first etch operation in the plasma chamber includes:

introducing a first etchant gas into the plasma chamber; and
powering up the plasma chamber to strike the first plasma to commence the first etch process.

Claim 11 (original): The method of claim 7, wherein performing the second etch operation in the plasma chamber includes:

introducing a second etchant gas into the plasma chamber; and

powering up the plasma chamber to strike the second plasma to commence the second etch operation.

Claim 12 (original):. The method of claim 7, wherein a thickness of the thin spacer layer is configured to range between approximately about 50 Å and 300 Å.

Claim 13 (original): The method of claim 7, wherein a thickness of the thin spacer layer is configured to range between approximately about 100 Å and 200 Å.

Claim 14 (original): The method of claim 7, wherein a thickness of the thin spacer layer is configured to be about 100 Å.

Claim 15 (original): The method of claim 10, wherein the first etchant gas is one of a combination of C₂F₆, CH₂F₂, and O₂, a combination of CF₄, CH₂F₂, and O₂, and a combination of CF₄, HBr, and O₂.

Claim 16 (original): The method of claim 11, wherein the second etchant gas is one of a combination of C₂F₆, CH₂F₂, and O₂ and a combination of O₂, HBr, and SF₆.

Claims 17-20 (cancelled)

Claim 21 (currently amended): A method for fabricating a spacer of a gate structure, the method comprising:

performing a first etch process using a first etchant gas, the first etch process
implementing an interferometry endpoint (IEP) detection process;

discontinuing the first etch process;

performing a second etch process using a second etchant gas having a high selectivity
toward a material of the spacer layer, the second etch process implementing optical emission
spectroscopy (OES) endpoint monitoring process; and

discontinuing the second etch process in response to the OES monitoring process,

wherein the second etch process is configured to remove a thin spacer layer remaining
subsequent to a removal of a portion of a spacer layer having a specific thickness during the
first etch process, leaving the spacer for the gate structure.

Claim 22 (new): A method for fabricating a silicon nitride spacer of a gate
structure, the method comprising:

performing a first etch process using a first etchant gas, the first etch process
implementing an interferometry endpoint (IEP) detection process;

discontinuing the first etch process;

performing a second etch process using a second etchant gas having a high selectivity
toward a material of the spacer layer, the second etch process implementing optical emission
spectroscopy (OES) endpoint monitoring process; and

discontinuing the second etch process in response to the OES monitoring process,

wherein the second etch process is configured to remove a thin silicon nitride spacer
layer remaining subsequent to a removal of a portion of a silicon nitride spacer layer having a
specific thickness during the first etch process, leaving the spacer for the gate structure.

Claim 23 (new): A method for fabricating a silicon nitride spacer of a gate structure, the method comprising:

performing a first etch process using a first etchant gas, the first etch process implementing an interferometry endpoint (IEP) detection process, the first etchant gas being selected from one of a combination of C_2F_6 , CH_2F_2 , and O_2 , a combination of CF_4 , CH_2F_2 , and O_2 , and a combination of CF_4 , HBr , and O_2 ;

discontinuing the first etch process;

performing a second etch process using a second etchant gas implementing optical emission spectroscopy (OES) endpoint monitoring process; and

discontinuing the second etch process in response to the OES monitoring process,

wherein the second etch process is configured to remove a thin silicon nitride spacer layer remaining subsequent to a removal of a portion of a silicon nitride spacer layer having a specific thickness during the first etch process, leaving the spacer for the gate structure.

Claim 24 (new): A method for fabricating a silicon nitride spacer of a gate structure, the method comprising:

performing a first etch process using a first etchant gas, the first etch process implementing an interferometry endpoint (IEP) detection process;

discontinuing the first etch process;

performing a second etch process using a second etchant gas implementing optical emission spectroscopy (OES) endpoint monitoring process, the second etchant gas being selected from one of a combination of C_2F_6 , CH_2F_2 , and O_2 and a combination of O_2 , HBr , and SF_6 ; and

discontinuing the second etch process in response to the OES monitoring process,

wherein the second etch process is configured to remove a thin silicon nitride spacer layer remaining subsequent to a removal of a portion of a silicon nitride spacer layer having a specific thickness during the first etch process, leaving the spacer for the gate structure.

Claim 25 (new): A method for fabricating a silicon nitride spacer of a gate structure, the method comprising:

performing a first etch process using a first etchant gas, the first etch process implementing an interferometry endpoint (IEP) detection process, the first etchant gas being selected from one of a combination of C_2F_6 , CH_2F_2 , and O_2 , a combination of CF_4 , CH_2F_2 , and O_2 , and a combination of CF_4 , HBr , and O_2 ;

discontinuing the first etch process;

performing a second etch process using a second etchant gas having a high selectivity toward a material of the spacer layer, the second etch process implementing optical emission spectroscopy (OES) endpoint monitoring process, the second etchant gas being selected from one of a combination of C_2F_6 , CH_2F_2 , and O_2 and a combination of O_2 , HBr , and SF_6 ; and

discontinuing the second etch process in response to the OES monitoring process,

wherein the second etch process is configured to remove a thin silicon nitride spacer layer remaining subsequent to a removal of a portion of a silicon nitride spacer layer having a specific thickness during the first etch process, leaving the spacer for the gate structure.